## REMARKS

Claims 1, 5-16, 21, 23, 25-26 and 28-29 are pending in the application. Please cancel claims 1, 5-16, 21, 23, 25-26 and 28-29. New claims 32-40 have been provided.

### *Claim Rejections – 35 USC 102*

Claims 1, 6, 14, 15, 21, 26, 28 and 29 have been rejected under 35 USC 102(b) as being anticipated by the patent issued to Isono et al (PN 5,315,377).

The Applicant believes, for reasons made explicit hereinunder, that the invention of the instant application as defined by previously submitted claims is not in fact anticipated by Isono. However, to improve clarity of the instant application and to further distinguish the instant application from prior art cited by the Examiner, all previously submitted claims have been cancelled and new claims 32-40 have been provided.

Claims 32-40 define a system for three-dimensional viewing having, in common with Isono, a display for displaying left and right picture elements of left and right images, a barrier layer presenting a parallax barrier formed of switchable elements, a head detection apparatus, and a controller operable to receive information from the head detection apparatus, to use that information in calculations, and to command sub-elements of the barrier and of the display.

In contradistinction to Isono, the invention of the instant application specifies that transparent elements of the barrier layer consist of a plurality of individually switchable pixels, that the system is operable to respond to detected lateral displacement of a viewer by switching individidual pixels belonging to transparent barrier elements from transparency to opacitiy while maintaining

transparency of other individual pixels also belonging to each of those transparent elements (claims 32, 34, 40), and that the system is further operable to respond to detected lateral displacement of a viewer by switching individual opaque pixels contingent to transparent elements of the barrier from opacity to transparency, also while maintaining transparency of other individual pixels also belonging to those transparent elements (claims 33, 35). It will be shown below that Isono neither teaches nor suggests such a configuration nor such a method, but rather presents a far more primitive and limited method for displacing the viewing zone from which a viewer may view his stereoscopic display.

In further contradistinction to Isono, new claims of the instant application further specify that the system is operable to respond to detected increasing distance of a viewer from the display by decreasing the number of barrier pixels forming each transparent barrier element (claims 36, 37, 38), and to respond to detected decreasing distance of a viewer from the display by increasing the numbre of barrier pixels forming each transparent barrier element (claim 39). As will be shown below, Isono does not teach nor suggest this possibility, but rather presents a quite different apparatus and method for dealing with the problem of variable distances of a viewer from the display.

The Applicant believes that none of the new claims herein submitted is anticipated by Isono. The Examiner has stated that Isono's discussion of methods of calculation of sizes and distances presented in column 9 of his disclosure implies characteristics of his system which characteristics anticipate claims of the instant application as previously submitted. Since those previously submitted claims have now been canceled the Examiner's rejections thereof are moot, yet respect to the possibility that the Examiner might regard new claims 32-40 as similarly being

anticipated by Isono's column 9 presentation, the Applicant presents arguments below showning that neither new claims 32-40 nor previulsy presented claims are in fact anticipated by Isono's column 9 discussion.

The applicant will show below that various portions of Isono's presentation specifically demonstrate that Isono did not contemplate creating a display adaptable to motion of a viewer with respect to the display using means and method presented by the instant application and defined by claims 32-40. It will be shown that Isono does specifically relate to adaptability of his system to displacement of a viewer with respect to the display, yet describes adaptation means which are either radically different from those of the instant application (e.g. his magnifier 56 for dealing with distance displacements of a viewer), and/or dramatically more primitive and less successfully adaptive than those of the instant application (e.g. his references to "phase shift" for dealing with major lateral displacements of a viewer and to an enlarged "view point O" (his Figure 3) for dealing with minor lateral displacements of a viewer). These arguments will now be presented in detail.

The Applicant's arguments may be summarized in the following main points:

1) Isono's apparatus is explicitly incapable of displacing his "view point O" by a distance of less than his "distance E", the distance between two eyes of a viewer.

2) Isono's presentation does not explicitly teach finely directing or displacing his "view point O" (the viewing zone within which a viewer's eye's sees image elements appropriate to it) by switching individual pixels within or contiguous

to transparent barrier stripes which stripes comprise a plurality of horizontally contiguous transparent pixels.

3) Isono's presentation of equations for calculating size and position of transparent elements of his barrier layer does not imply the use of multile contiguous pixels in transparent stripes, and his disclosure at several points explicity denies such a configuration and contradicts such an interpretation of his disclosure.

4) The requirement for creating and maintaining an appropriate difference in sizes between sizes transparent stripes on Isono's barrier layer and sizes of picture elements on Isono's display, and for adjusting such size differences as a function of the distance of a viewer from the display, is explicitly solved by Isono using a mechanism totally different from that presented by the instant application.

Each of the above points will now be presented in detail.

1) **Isono's apparatus is explicitly incapable of fine direction of his "view point O".**

The invention of the instant application *is* capable of fine direction of what Isono calls "view point O", as is discussed in detail in the instant application, particularly with reference to Figures 19, 21, 23, and 24 therein. Mechanisms enabling fine direction of view point O are explicitly defined in new claims 32-40. Isono, in contrast, at several points of his disclosure explicitly states that his apparatus is *not* capable of similar fine direction.

Thus, we see in col. 5, lines 40-44:

> The detecting unit 8 detects the head position of the viewer and generates a display control command to the computer 20 when the head position of the viewer has moved by ***only*** a distance E between the right and left eyes. (emphasis supplied)

Similarly, in column 11 lines 40-56, we read:

> When the right eye OR is at the position as shown in FIG. 2, the image elements R.sub.1, R.sub.3, R.sub.5, . . . are observed through the aperture slits by the right eye OR. However, when the right eye OR moves to the position of the left eye in FIG. 2, that is, when the head position of the viewer moves by the distance E (about 6.5 cm) between both eyes, image elements L.sub.2, L.sub.4, L.sub.6, . . . can be observed through the aperture slits. When the movement of the head position is detected, the detecting unit 8 generates a barrier phase shift command to the computer 20. In response to the barrier phase shift command, the computer 20 controls the controller 22 so as to shift the position of the stripe barrier by a distance corresponding to one image element. Thus, even when the head position of the viewer moves by the distance E between both eyes, the image elements R.sub.1, R.sub.3, R.sub.5, . . . can be observed through the aperture slits.

Thus, with respect finely directing viewing zones so as to enable adaptation to fine lateral movements of a viewer with respect to a display, Isono's system and method are clearly different from, and more primitive than, the system and method of the instant application as defined by new claims 32-40.

2) **Isono's presentation does not explicitly teach switching of individual pixels within multi-pixel-wide transparent barrier stripes as a means for fine direction of view point O.**

Isono certainly did not explicitly teach use of multiple-pixel-wide transparent stripes to displace "view point O" of a viewer by a distance less than distance "E", the distance between a viewer's eyes. As we have seen above, Isono's system is explicitly incapable of such fine adaptation to user movement. Indeed, except for Isono's Figure 6D, no portion of Isono's disclosure teaches or implicitly requires transparent strips having a width of more than single switchable pixel. With respect to Isono's Figure 6D, no use for the configuration shown in Figure 6D is

discussed anywhere within Isono's disclosure, and that configuration is certainly not connected in any way to directing or displacing "view point O".

3) **Isono's presentation of equations for calculating size and position of transparent elements of his barrier layer does not imply the use of horizontally displaced multile contiguous pixels in transparent stripes, and his disclosure at several points explicity denies such a configuration.**

The Examiner has stated, with respect to the transparent stripes formed on Isono's parallax barrier layer, that "it is **implicitly** true that each of the strips or subareas is formed by or includes a *plurality of horozontally contiguous pixels* that are switched to be either transparent or opaque" Whereas the Applicant believes this to be the case with respect to Isono's discussion of **opaque** stripes (which, in the case of "multiview" presentations, are described as being wider, by even multiples, than Isono's transparent stripes), with the exception of Isono's Figure 6D discussed above, Isono nowhere presents nor disucsses use of transparent stripes wider than a single pixel width in his parallax barrier layer.

Isono's equations presenting means for determining the size and position of transparent elements of his barrier layer do not necessarily imply the use of multiple contiguous pixels in transparent stripes. Since the calculations presented by Isono are dictated not only by the requirements of Isono's configuration but also by the laws of optics as regarding any viewing of a display through a barrier, it is necessarily the case that spatial relationships presented by Isono in explaining his invention are also true with regard to the invention of the instant application. However, nothing in Isono's column 9 discussion implies that multiple pixels might be used to create a

transparent barrier element more than a single pixel wide. To the contrary, at several points Isono's discussion states or implies that this is not the case.

Thus, we read in Isono's discussion of his Figure 2 in column 9 lines 39-40: "I indicates a central distance between the pixels on the image display surface, that is, a pixel pitch." Yet we see from the figure that "I" is the width of a left or right picture element of a left or right image. Thus, left and right picture elements presented on Isono's display are identified as individual pixels of the display hardwar, and not as horizontally extensive collections of pixels. Similarly, we read in his discussion of his Figure 1 (col. 4 lines 11-14): "A display section 100 includes two liquid crystal display panels 28 and 46 of a transmitting type having the same distance between image elements, that is, the same pixel pitch..." Here too, image elements, both of Isono's display and of Isono's barrier layer, are identified as individual pixels of the display hardware.

And yet again, in col. 7 lines 9-17 we read: "When a ... phase shift command from the detecting unit 8 is supplied as a display control command, the computer 20 generates a barrier movement command to the controller 22. In response to the barrier movement command, the controller 22 drives the drivers 24 and 26 in such a manner that the parallax barrier displayed on the panel 28 is shifted to the right or left by a distance corresponding to one pixel in a real-time manner." Note that this is the "phase shift" discussed in the passage from col. 11 lines 40-56 quoted above, wherein it is stated that the result of the phase shift is to entirely replace transparent portions of the barrier with opaque portions and vice versa. Thus it is clearly demonstrated that a single pixel shift in the position of Isono's barrier completely reverses the configuration of the barrier, clearly implying that each transparent portion of the barrier is only a single pixel wide.

It remains to be explained how, in the absence of multiple-pixel-wide transparent barrier elements (and display image elements), Isono's apparatus allows for the fact that, as shown in his Figure 2 and the equations of his column 9, transparent barrier elements of width "B" must be slightly more narrow than display image elements of width "I". The Examiner states "Isono et al teaches that the *size* of of the transparent stripe is "B" and it is determined by the pixel size of the *display device* and the distance between the image display and barrier panel (D) and the distance between the observer and the image display (C), (please see column 9), this means that the size "B" is a variable and should be *adjusted* when the abovementioned distances are changed. This *implicitly* means the for different size or values of B for the transparent pixel stripe, different number of switchable pixels in the barrier is used."

The Examiner's conclusions quoted in the preceding paragraph with respect to the *implicit* meaning of Isono's column 9 presentation are respectfully traversed. Isono does in fact explicitly present two devices and methods for dealing with the required size difference between size "I" of image elements on the display and size "B" of transparent elements of the barrier, and Isono's disclosure might be said to imply an additional solution, yet none of those solutions necessitate multiple-pixel-width transparent barrier elements, and certainly none explicitly contain such elements.

A first solution, presented in Isono's discussion of his Figure 10, is that for a given configuration his barrier layer might be provided with a slightly different pixel pitch than that of his display layer. We read on col. 13 lines 23-26, "In the modification, a width of one pixel of the PDP 92 is wider than that of the LCD panel

28 by only a predetermined magnification." This configuration would not be adjustable, but would provide a working solution. A second solution, not stated nor implied by Isono yet readable from his disclosure, is that the means for extending the width of viewing zones ("view point O") as shown in Isono's Figure 3 would also permit some laxity in the definition of the dimensions of Isono's barrier elements. This solution might be adequate particularly for narrow displays.

Isono provides a third and more detailed solution to the problem. As we read in col. 4 lines 14-16, to deal with the requirement for slightly differing sizes between image elements of width "I" and barrier elements of width "B", "an image enlarging section 56 of a transparent material [is] arranged between the panels 28 and 46". And, in greater detail, we read in col. 4 line 58 to col. 5 line 8,

> The enlarging section 56 electrically and dynamically enlarges the image displayed on the panel 46. In the parallax barrier system, generally, in order to observe the image stereoscopically from a position of a finite distance, a width I of an element, e.g., the pixel in this embodiment, of the image on the panel 46, namely, must be slightly wider than an width B of an opening of the barrier on the panel 28, that is, B<I. If the panels 46 and 28 have the same pixel pitch (I=B), the enlarging section 56 slightly enlarges the width I of the 3D image displayed on the panel 46 and forms the enlarged image having a width of IP. A focal distance is controlled so as to satisfy the condition of B<IP. When an interval D between the panels 28 and 46 has been predetermined, even if a distance C between the viewer 400 and the panel 46 changes, the image can be stereoscopically observed within a wide distance range by controlling a magnification of the enlargement. Although the actual value of B/IP is less than 1, it is fairly close to 1.

Thus, it has been shown that the fact that Isono's device requires differing sizes or values of B under different conditions does not imply differing numbers of switching pixels in the barrier panel. It has also been shown that such a construction has been explicitly or implicitly denied at several points of Isono's disclosure.

**4) Isono's device and methods for adapting to changes in distance of a viewer from his display is entirely different from that presented by the instant application.**

Apparatus taught by the instant application for adapting to changes in distance of a viewer from the display is defined by new claims 36-39. These claims may be compared to the apparatus and method taught by Isono, as exemplified by the quotation from col. 4 line 58 to col. 5 line 8 presented immediately above. Isono's method for dealing with changes in user distance from the display is also unambiguously stated in col. 7 lines 17-24:

> When a distance change command is supplied as a display control command from the input unit 6, the computer 20 generates a magnification change command to the controller 58. In response to the magnification change command, the controller 58 drives a driver 57 so that the image can be stereoscopically observed from a position of the designated distance.

As may be clearly seen, Isono's device and method for adapting his display system to changes in the distance of a viewer from the display is unambiguously different from that of the instant application, and in no way anticipates claims 36-39, nor any of the other new claims presented herein.

Thus, the Applicant believes he has shown that new claims 32-40 are not anticipated by Isono.

It may further be noted that the instant invention as defined by claims 32-40 and presented in particular in the discussion of Figures 19, 21, 23 and 24 of the instant disclosure is non-obvious in view of Isono's patent as well: there exists a significant practical and conceptual barrier to the creation of the barrier system described in the present claims, in that a liquid crystal of extremely fine division is required. Using a plurality (e.g. 6-10) subunits of such a barrier to create each

transparent stripe of the barrier, and at least the same number of subunits to create the opaque stripes, providing a useful 3D display system cannot be accomplished, in a practical sense, using standard liquid crystal display panels: the width of individual pixels on standard displays is such as to make the resulting parallax barrier useless for creating a 3D display: the barrier would be so sparse and the opaque regions so thick that the image would have appeared to have bars in front of it. A specially designed and very finely constructed liquid crystal panel would be required to produce an embodiment of the present system which would produce a pleasing 3D display.

***Claim Rejections – 35 USC 103***

The Examiner has rejected various claims under 35 USC 103(a) as being unpatentable over the patent issued to Isono et al., to Morishima, or to combinations thereof. As all previously presented claims have been canceled by the present communication, the Examiner's rejections thereof are moot. With respect to new claims 32-40, the Applicant believes that arguments presented hereinabove show that claims 32-40 are patentable over Isono with respect to 35 USC 103 as well as with respect to 35 USC 102. With respect to Morishima, the Applicant believes that it is clear that Morishima does not teach anything ressembling the configurations defined by new claims 32-40.

In view of the foregoing, it is submitted that all the claims now pending in the application are allowable over the cited references. An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,

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